

# PATENT SPECIFICATION

730,196



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## COMPLETE SPECIFICATION

### Electro-Magnetically operated Devices Particularly Employed in Horological Mechanisms.

I, PAUL DARGIER DE SAINT VAULRY, of Byans-sur-le-Doubs (Doubs), France, a French Citizen, do hereby declare the invention, for which I pray that a patent may be granted to me, and the method by which it is to be performed, to be particularly described in and by the following statement :

This invention has for its object an improvement in electro-magnetically operated devices of the type used in horological mechanisms, said devices being of the well-known type in which the pole-pieces of the field piece or stator form a substantially continuous magnetic flux around the rotor.

According to my invention, the device is of the type comprising a stator with one or more field coils and a rotor placed for rotating or oscillating between the pole pieces of said stator, said device further including a permanent magnet forming a shunt between said pole pieces and inducing in the stator a flux having a direction opposite the direction of the flux produced by said coils. This structure is of interest inasmuch as it does not obstruct the gap between the actual pole pieces.

I am aware of several prior constructions in which connecting pieces exist between the pole shoes of the stator. But in all these cases the connecting pieces are constituted by metallic members or bridges of magnetic conducting material and not by magnets as in my invention.

I have illustrated my invention in accompanying drawings given by way of exemplification and wherein :—

Figs. 1 to 3 relate to conventional arrangements of the stator and rotor in electro-magnetically operated devices ; and

Fig. 4 shows my improved magnetic shunt.

It is known that electro-magnetically operated devices employed in horological apparatus consist, as shown diagrammatically in Fig. 1, firstly of a stator 1 made of a magnetic

metal in which an intermittent magnetic field flux is created by means of one or more coils 2, and secondly of a rotor 3 made of a magnetic material and capable of rotating or oscillating on a shaft 4 between the poles 5 and 6 of the stator 1.

It is known that the output of devices of this type is proportional to the variation of the magnetic flux induced in the stator by the current passing through the coils.

It is possible to improve this output by increasing the variation of the flux in the coil, by means of a permanent magnetic shunt which creates a permanent magnetic flux having a certain uniform direction which is opposite the direction of the flux induced by the coil 2. When the coil 2 is energised the flux produced by magnet 7 diminishes the value thereof. When the coil is de-energised the flux created by magnet 7 annihilates the remanent magnetism in the stator. In this way the variation of the flux is highly increased ensuring thereby a precise and reliable operation.

The desired result is obtained in practice by placing across the poles 5 and 6 of the stator 1 a magnetic shunt consisting of a permanent magnet 7, as shown in Fig. 2.

A similar result may obviously be obtained by placing the magnetic shunt for instance as shown in Fig. 3. Thus the rotation of the rotor 3 on its shaft 4 causes the permeance of the magnetic circuit to vary and thereby produces a variation of the permanent flux produced by the shunt, which variation is added to the variation of the intermittent flux produced by the coil.

Now, according to my invention, I secure mechanically to the stator 1 a permanent magnet 7 extending in a plane parallel with the plane of said stator.

What I claim is :—

1. An electro-magnetically operated device for use in horological mechanisms of the type comprising a stator with one or more

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field coils and a rotor placed for rotating or oscillating between the pole pieces of said stator, said device further including a permanent magnet forming a shunt between 5 said pole pieces and inducing in the stator a flux having a direction opposite the direction of the flux produced by said coils.

2. A device according to Claim 1 wherein

the said permanent magnet is secured to the pole pieces of the stator.

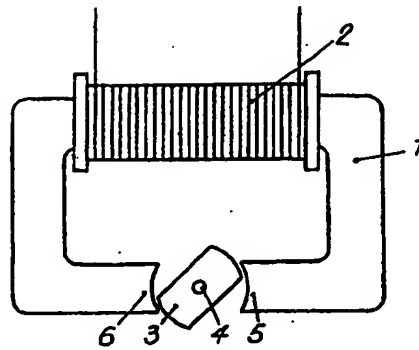
3. An electro-magnetically operated device substantially as described with reference to and as illustrated in Figs. 2, 3 and 4 of the accompanying drawings.

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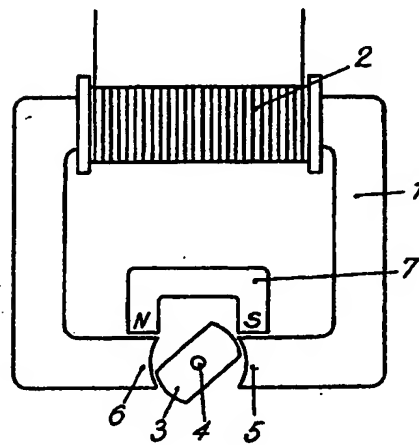
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**Fig. 1**



**Fig. 2**



**Fig. 3**

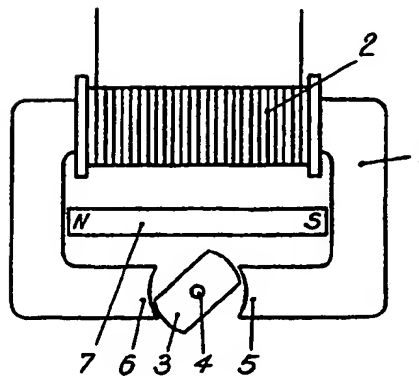


FIG. 4

